

Remarks

The Applicants have amended Claims 1, 2, 10 and 12 to recite that the ratio N/AI is 0.6 or more and the N in the dissolved state is 0.0030% or more. These ranges are inherently supported by virtue of the “or more” language in each case. Entry into official file is respectfully requested.

The Applicants acknowledge the rejections of Claims 1-5, 10, 12 and 14-15 under 35 U.S.C. §103 over the hypothetical combination of Tosaka with Maid. The Applicants note with appreciation the Examiner’s detailed comments concerning the hypothetical application of both references to the solicited claims. Nonetheless, the Applicants respectfully submit that even if one of ordinary skill in the art were to make the hypothetical combination, the resulting combination would still fail to teach or suggest the invention as recited in the solicited claims for the reasons set forth in detail below.

As noted above, independent Claims 1, 2, 10 and 12 recite that the ratio N/AI is 0.6 or more. This is sharply contrasted to Maid which fails to disclose, teach or suggest that ratio. In particular, with steel sheets of Maid, when the maximum value of N is 0.011% and the minimum value of AI is 0.02%, the ratio N/AI is 0.55 at a maximum. This is, of course, well outside the claimed ratio N/AI of 0.6 or more.

Maid also fails to disclose, as frankly acknowledged by the Examiner, that the amount of N in the dissolved state is 0.0030% or more. Also, the Applicants respectfully submit that it would be nothing more than unsupported speculation that the amount of dissolved N in Maid would satisfy the claimed range. There is utterly nothing in Maid that would leave one of ordinary skill in the art to the conclusion that the claimed amount of dissolved N would necessarily be present. Of course, a rejection based on inherency must demonstrate that the

claimed aspect is necessarily present. There is no demonstration on the record that the dissolved amount of N in Maid would necessarily be 0.0030% or more.

In any event, the Applicants' sheets can be obtained by regulating the contents of the composition elements such as N and Al and composing phases within a predetermined range and strictly controlling the solid-solution N content and crystal grain size. The steel sheet produces an excellent result of superior strain aging hardenability which is expressed by values of BH and ΔTS . Maid discloses (A2 and B2 in Table 2) that an increase in the yield point in the range from 40 to 80 MPa was found after a temper treatment at about 170°C for 20 minutes after the strips or sheets had first been subjected to a three percent pre-deformation. However, in sharp contrast, the Applicants' steel sheets secure BH amounts of 80 MPa or more through approximately equivalent strain aging hardening, demonstrating superior strain aging hardenability over Maid.

Also, a main cause of an increase of YP through strain aging hardening of the Maid steel is the low YP of 0.70 or less before aging treatment which is different from the strain aging hardening arising from a large amount of solid-solution N content in the Applicants' steel sheets. Thus, the steel sheets claimed herein are dissimilar from the standpoint of metallurgical principles. As proof, it is noted that Maid recognizes the addition of N and in a stoichiometrically equivalent amount of Ti while the presence of solid-solution N is not obligatory. Moreover, Maid discloses that aging by N in a hot-rolled sheet is suppressed by the addition of Ti. This quality is completely contrary to the property of the claimed steel sheets.

In the claimed steel sheets, a substantial increase of TS (ΔTS) through strain aging hardening, as the most significant function of the steel sheet, is manifested. That function is imparted by delicate control of the solid-solution N and this function is not taught or suggested by Maid. Thus, the Applicants respectfully submit that the evidence of record indicates that the

steel sheets of Maid are sharply different from those set forth in the solicited claims.

The rejection hypothetically combines Tosaka with Maid to take the disclosure concerning hot-dipped galvanizing and refinement of ferrite grain size as taught by Tosaka and apply it to the steel sheets of Maid, as set forth at the top of page 4 of the Official Action. The problem with this combination is that even if it is made, the resulting combination still utterly fails to teach or suggest the subject matter of the recited claims. As noted above, Maid utterly fails to disclose, teach or suggest the claimed ratio N/Al of 0.6 or more and utterly fails to disclose, teach or suggest the amount of dissolved N being 0.030 or more. Hypothetically combining the hot-dip galvanizing and refinement of ferrite grain size teachings of Tosaka with Maid would not change or cure this deficiency. Thus, even if the combination were to be made, the resulting steel sheets would still not be the same as those recited in the solicited claims.

Moreover, the characteristic of the Applicants' steel sheets of superior strain aging hardenability originated in solid-solution N is unable to be expected from Tosaka. Furthermore, there is no particular teachings or suggestions pertaining to strain aging hardening by solid-solution N in Tosaka. Steel sheets having superior strain aging hardenability such as those in the solicited claims are unable to be obtained even by applying the teachings of Tosaka to the steel sheets of Maid. The Applicants have demonstrated that it is important to control the relative amounts of N and Al such that the amount of N relative to Al is 0.6 or more. Also, it is important that the amount of N in the dissolved state is 0.030 or more. Maid utterly fails to teach or suggest this and there is nothing on this record that would lead one of ordinary skill in the art to the conclusion that such relative quantities would necessarily be present. In fact, the evidence is quite to the contrary. Therefore, the Applicants respectfully submit that the solicited claims are patentable over Maid when taken individually. The Applicants further respectfully submit that

hypothetically combining the teachings of Tosaka would utterly fail to cure the deficiencies of Maid as set forth above. Therefore, even if one of ordinary skill in the art were to make the hypothetical combination, the resulting steel sheets would still fail to teach or suggest the subject matter recited in the solicited claims. Withdrawal of the rejection of the claims based on the combination of Tosaka with Maid is accordingly respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury
Reg. No. 31,750

TDC:vbm
(215) 656-3381